

**PATENT COOPERATION TREATY**  
**PCT**

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**  
 (Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference WO 21.1140	<b>FOR FURTHER ACTION</b>	See Form PCT/IPEA/16
International application No. PCT/EP2004/010658	International filing date (day/month/year) 22.09.2004	Priority date (day/month/year) 07.10.2003

International Patent Classification (IPC) or national classification and IPC  
G06F09/45, E21B33/035, E21B43/12

Applicant <b>SERVICES PETROLIERS SCHLUMBERGER et al.</b>
---

- This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 5 sheets, including this cover sheet.
- This report is also accompanied by ANNEXES, comprising:
  - sent to the applicant and to the International Bureau a total of 3 sheets, as follows:
    - sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 807 of the Administrative Instructions).
    - sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
  - sent to the International Bureau only a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
- This report contains indications relating to the following items:
  - Box No. I Basis of the opinion
  - Box No. II Priority
  - Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
  - Box No. IV Lack of unity of invention
  - Box No. V Reasoned statement under Article 36(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
  - Box No. VI Certain documents cited
  - Box No. VII Certain defects in the international application
  - Box No. VIII Certain observations on the international application

Date of submission of the demand 28.04.2005	Date of completion of this report 11.11.2005
Name and mailing address of the international preliminary examining authority European Patent Office - P.B. 5016 Peltolaan 3 NL-2290 HV Rijswijk - P.O. Box Tel. +31 70 340 - 2040 T/C 31 851 epo n Fax: +31 70 340 - 2016	Authorized Officer Dantinne, P Telephone No. +31 70 340-3396

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/EP2004/010658

**Box No. I Basis of the report**

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item:
  - This report is based on translations from the original language into the following language, which is the language of a translation furnished for the purposes of:
    - International search (under Rules 12.3 and 23.1(b))
    - publication of the international application (under Rule 12.4)
    - international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the elements<sup>1</sup> of the international application, this report is based on (replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):

**Description, Pages**

1-13 as originally filed

**Claims, Numbers**

1-13 received on 26.04.2005 with letter of 25.04.2005

**Drawings, Sheets**

1/4-6/4 as originally filed

- a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3.  The amendments have resulted in the cancellation of:
  - the description, pages
  - the claims, Nos.
  - the drawings, sheets/figs
  - the sequence listing (specify):
  - any table(s) related to sequence listing (specify):
4.  This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
  - the description, pages
  - the claims, Nos.
  - the drawings, sheets/figs
  - the sequence listing (specify):
  - any table(s) related to sequence listing (specify):

\* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/EP2004/010658

---

**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

---

**1. Statement**

Novelty (N)	Yes:	Claims	1 - 13
	No:	Claims	
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1 - 13
Industrial applicability (IA)	Yes:	Claims	1 - 13
	No:	Claims	

**2. Citations and explanations (Rule 70.7):**

**see separate sheet**

INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(SEPARATE SHEET)

International application No.  
PCT/EP2004/010658

Re Item V.

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

The following documents are referred to in this communication; the numbering will be adhered to in the rest of the procedure:

- D1: US-B-6 422 3151 (DEAN QUENTON WAYNE) 23 July 2002
- D2: US 2002/159439 A1 (MARSH ANITA B ET AL) 31 October 2002
- D3: US 2002/180798 A1 (MAHONEY MARGARET MARY ET AL) 5 December 2002
- D4: US-B-6 202 2081 (HOLIDAY JR MATTHEW R) 13 March 2001
- D5: US 2002/174010 A1 (RICE JAMES L) 21 November 2002

1) The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 and 8 does not involve an inventive step in the sense of Article 33(3) PCT.

1.1) Document D1 discloses (cf. column 11 line 15 - 29; column 5 line 36 - 39) a subsea controller located under the sea level for managing a plurality of tools in a subsea well installation. This subsea controller can have executable programs downloaded from PCS/surface controller. D1 describes the prior art described in the application (page 3 paragraph 11).

1.2) The problem to be solved by the present invention may be regarded as (see application; page 6 paragraph 29-31) :

Avoid losing data (by stopping the controller) from the subsea controller while uploading the subsea controller with updated software.

1.3) Confronted with this problem the man skilled in the art of subsea engineering will necessarily consult a man skilled in the art of programme loading. An obvious solution to the problem is dynamic download which means that a software can be downloaded without stopping the execution of the existing program for example by using a virtual machine. Such dynamic loading is described in D2 ( fig. 4; paragraph 5 - 12) where an application is

**INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(SEPARATE SHEET)**

International application No.  
**PCT/EP2004/010658**

downloaded and executed via a virtual machine. The main goal of D2 is to allow download to the controller while the controller is operational. This is done by using a JVM which executes (see paragraph 51 & 52) the downloaded application module just like in the application. Note that one of the basic of JVM is to allow dynamic operations.

1.4) Therefore the solution proposed in claim 1 and 8 of the present application cannot be considered as involving an inventive step (Article 33(1) & 33(3) PCT).

2) Dependent claims 2-7 and 9-13 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT with respect to novelty and/or inventive step, the reasons being as follows:

claims 2,3,9,10 : D3 discloses a native application with an interface to enable two-ways access with an application.

claims 4,12 : D4 defines a main memory and a virtual machine memory distinct from each other.

claim 5 : Software protection using a key code is known. See D5.

claims 6,13 : It is obvious to include a driver in the software update if a new tool is installed.

claim 7 . D1 describe a subsea well installation.

claim 11 : D2 discloses dynamic loading.

28.04. 2005

PATENT APPLICATION  
ATTORNEY DOCKET NO. 211349

(91)

## Claims

- [e1] A sub-sea controller (31) located under the sea level for managing a plurality of tools in a sub-sea well installation, the sub-sea controller (31) comprising:
  - downloading means to download an application module (35<sub>a</sub>) to the sub-sea controller (31); and
  - a virtual machine (36) to execute the downloaded application module (35<sub>a</sub>).
- [e2] The sub-sea controller (412) according to claim 1, further comprising:
  - a native application (47) implemented within the sub-sea controller (412); and
  - a native interface (48) implemented within the sub-sea controller (412), the native interface (48) enabling the application module (45<sub>a</sub>) to access the native application (47).
- [e3] The sub-sea controller (412) according to claim 2, wherein
  - the native interface (48) enables the native application (47) to access the application module (45<sub>a</sub>).
- [e4] The sub-sea controller (412) according to any one of claims 2 or 3, further comprising:
  - a native memory wherein the native application (47) is executed; and
  - a defined memory wherein the application module (45<sub>a</sub>) is executed, the defined memory being distinct from the native memory.
- [e5] The sub-sea controller (412) according to any one of claims 2 to 4 further comprising:
  - a protection register, the protection register authorizing an access to the native application only if a key code is written hereinto;
  - accessing means to access the protection register from the application module.

- [e6] The sub-sea controller (45<sub>a</sub>) according to any one of claims 1 to 5 wherein the application module (45<sub>a</sub>) contains a driver for a tool.
- [e7] A sub-sea well installation a sub-sea controller (31) according to any one of claims 1 to 6.
- [e8] A method for updating a software of a sub-sea controller (31) located under the sea level, the sub-sea controller (31) managing a plurality of tools in a sub-sea well, the method comprising:
  - downloading an application module (35<sub>a</sub>) into the sub-sea controller (31); and
  - executing the application module (35<sub>a</sub>) using a virtual machine (36) implemented within the sub-sea controller (31).
- [e9] The method according to claim 8, further comprising:
  - executing a native application (47) of the sub-sea controller (42) within the sub-sea controller (412);
  - executing a native interface within the sub-sea controller (412);
  - accessing the native interface from the native application (47) to exchange data with the application module (45<sub>a</sub>).
- [e10] The method according to claim 8, further comprising:
  - executing a native application (47) of the sub-sea controller (42) within the sub-sea controller (412);
  - executing a native interface within the sub-sea controller (412);
  - accessing the native interface from the application module (45<sub>a</sub>) to exchange data with the native application (47).
- [e11] The method according to any one of claims 9 or 10, wherein the downloading and the executing of the application module (45<sub>a</sub>) are performed without interrupting an executing of the native application of the sub-sea controller (412).

- [e12] The method according to any one of claims 9 to 11, further comprising:  
executing the application module (45<sub>n</sub>) in a defined memory;  
executing the native application (45<sub>a</sub>) in a native memory;  
wherein the defined memory is distinct from the native memory.
- [e13] The method according to anyone of claims 8 to 12 wherein the application module (45<sub>n</sub>) contains a driver for a tool.